Insecticide Use in Wheat is Key for Food Security in the Near East and West Asia

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Since the dawn of agriculture, wheat has been the basic food crop in West Asia and the Near East. Wheat products provide over 40% of the per capita dietary supply of calories and protein in most of the countries in these regions. Sunn pest is the main pest affecting wheat production in West Asia and the Near East and constitutes a major threat to wheat production. Sunn pest infestations spread over 15 million hectares. It is found in south east Turkey, most of Iran, Iraq, Syria, Lebanon, Jordan, Israel, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Afghanistan, and Pakistan.

The sunn pest are a group of insects representing several genera of the shield bug and stink bug families. The sunn pest lives for one year and produces a single generation per year. About three months are spent feeding in wheat fields. The rest of the year is spent resting and in hibernation on hillsides which are usually about 10-20 km from the wheat fields. In spring, the surviving adults migrate down to the wheat fields in one non-stop flight and, after feeding, mate and lay eggs. The adults of the next generation appear and feed intensively in order to accumulate fat reserves for the hibernation period. They return to the higher elevations following wheat harvest.

Sunn pest feeding on wheat results in yield loss as most of the kernel contents can be sucked out by the insect, resulting in smaller, lighter, and shriveled kernels. The whole plant can be killed. If chemical control measures are not taken, 100% yield loss can result [1]. In addition, the sunn pest injects digestive enzymes to liquefy the wheat tissues into a nutrient-rich slurry. These enzymes destroy gluten, add a foul smell, and reduce the baking quality of flour [2]. Dough made from damaged grain has a sticky and soft texture and does not knead or rise properly [3]. The bread is of poor quality due to its crumbly texture, low porosity and indigestibility. Grain with feeding damage to more than 2% of kernels is rejected and cannot be sold.

In some countries, foliar applications of insecticides to control sunn pest are made by air by governments, while in others, ground sprays, partially supported by the government, are made by farmers [2]. A single spray will often suffice to control populations effectively [3]. Integrated Pest Management (IPM) efforts have established the economic injury level and sampling methods used by extension service personnel who monitor fields for overwintering adults and egg parasitism. Spraying is not conducted if the densities are low or if the parasitism rate is high [4]. At present, no chemical program is used against sunn pest in Pakistan because populations remain below economic thresholds.

About 4 million acres are sprayed annually to control the sunn pest at a cost of about $150 million [5][6][7]. In Afghanistan, a single year of insecticide treatments prevented food deficits for 350,000 people [5].

References